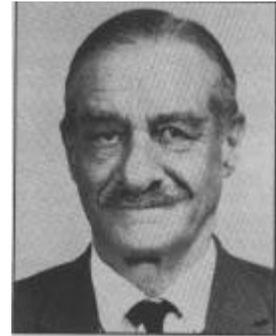


RALPH A. BAGNOLD: SOLDIER, EXPLORER, AND SCIENTIST

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Ralph A. Bagnold (1896-1990) had an innate curiosity and inventiveness as a young boy that was encouraged by his father, a British Army Royal Engineer. Young Bagnold followed a family tradition when, after completing a war-shortened training program in 1915, he became an officer in the British Army Royal Engineers. He spent three years in the deadly trenches in France, after which he utilized a special military educational leave program to study engineering at Cambridge University, receiving an honors degree in 1921 and returning to active duty with the army.



Ralph Alger Bagnold†

It was a life-long yearning to explore the unknown that led him and his associates, during the period between World War I and World War II when he was stationed in Cairo and later in India, to explore the desert. Using vacation leave periods and personal vehicles, he and his colleagues drove thousands of kilometers in Trans-Jordan, in the Sinai, and in that part of the northeast Sahara known as the Libyan Desert. The sizes and striking geometry and symmetry of the desert sand dunes together with the vastness of the great sand sheets stimulated his desire to understand their origin and evolution, i.e. to understand the processes by which sand is moved by the wind.



Ralph Bagnold (age 7) with his sister Enid.*



Home on leave, 1916.*



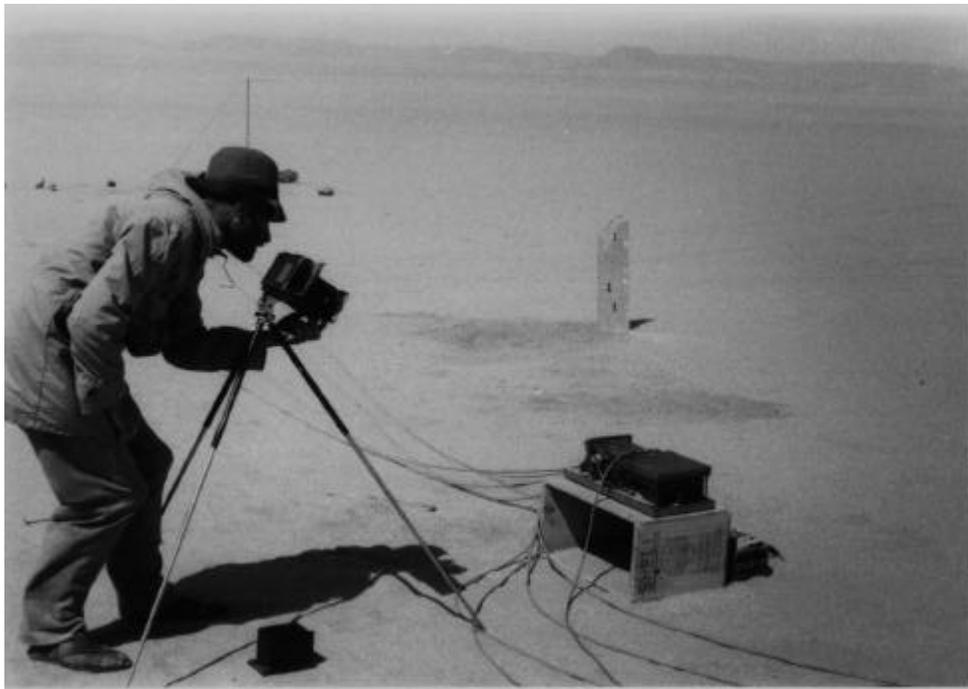
With specially modified Model-T Ford, 1929.*



On the Great Selima Sand Sheet, 1930. *



Stuck in mud from shallow groundwater in northern Sudan, 1932. *



Wind studies using a multiple mamometer in sand storm near Gilf Keber, 1938. Photograph by Ronald Peel. *

Following his medical retirement from the army in 1935, his deep sense of curiosity, combined with his sound background in basic physics and mathematics and his inventiveness, resulted in his building and instrumenting wind tunnels and running experiments with them in the laboratory and in the field. These experiments and his careful field observations led to his classic, "The Physics of Blown Sand and Desert Dunes," completed in 1939 and published in 1941.

Although medically retired, he was recalled to active duty as a Signals Officer as war in Europe erupted in 1939; he was posted to East Africa. A visit to Cairo while his troopship was undergoing repairs in Port Said following a collision at sea, resulted in his being reassigned to Egypt. Concerned about the vast unprotected desert flank west and south of Cairo, Bagnold proposed to General Sir Archibald Wavell, Commander in Chief of Middle East Land Forces, the establishment of a small organization equipped with desert-worthy vehicles that clandestinely could observe enemy vehicular traffic along the coast road in northern Libya and Egypt and could attack remote desert outposts and airfields southward. As Bagnold remarked to Wavell, "How about some piracy on the high desert?" Wavell's response was immediate and positive, and thus was born the Long Range Desert Group (LRDG) that very effectively put to use the knowledge and experience that Bagnold and his colleagues had accumulated during their earlier travels and that utilized the techniques and knowledge that they had developed, among them the sun compass and a closed cooling system for their vehicles. The LRDG very effectively tied down significant Italian and German military resources that otherwise would have been available to use against the British farther north and, through their "road watches," provided invaluable information of movements of enemy troops and material east and west along the coast road in Egypt and Libya.

After the war, Bagnold continued his interest in the movement of sand, expanding his research to include water-borne sand. Through the influence of his good friend Luna B. Leopold, he was supported in much of this work by the U.S. Geological Survey. Bagnold was a Fellow of the Royal Society and was awarded the Founders' Gold Medal of the Royal Geographical Society, the Wollaston Medal of the Geological Society of London, the G.K. Warren Prize of the U.S. National Academy of Science, the Penrose Medal of the Geological Society of America, and the Sorby Medal of the International Association of Sedimentology. In 1978, he was the keynote speaker at a NASA-sponsored conference on eolian processes on Earth and Mars. He expressed great pleasure that his fundamental work on movement of particles on Earth by wind could be applied to other planetary bodies with atmospheres, e.g. Mars.

Late in life, Bagnold remarked: "My main urge, from boyhood on, was curiosity...At first the curiosity was how my toys were made, and with a push from my father, how I might mend them for myself...In Egypt, with so many ancient sites strewn about...but difficult to reach, the call became 'go there and see'. This led to the huge satisfaction of desert exploration...to [the study of] those processes responsible for the vast, organized, and moving forms of the desert dune systems." He once remarked that he was not a very keen soldier and that he would rather be a Fellow of the Royal Society than a Brigadier General; it was a measure of his remarkable abilities that he became both.

†From 'Memorial to Ralph Alger Bagnold' 1896-1990 by M.J. Kenn, 1992. The Geographical Society of America.

* These photographs, provided by C. Vance Haynes, also appear in "Sand, Wind, and War: Memoirs of a Desert Explorer" by Ralph A. Bagnold. 1990. The University of Arizona Press. Tucson.